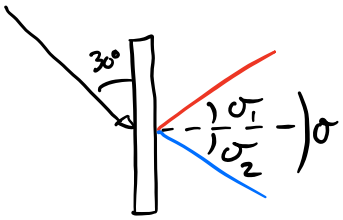
P: 20, 22, 24

23.P.20



$n_R = 1.52$
$n_V = 1.55$

$\theta = \theta_R + \theta_V = 19.20° - 18.82° = 0.385°$

$n_1 \sin\theta_1 = n_R \sin\theta_R$ $\quad$ $n_1 \sin\theta_1 = n_V \sin\theta_V$

$\theta_R = \sin^{-1}\left(\frac{n_1 \sin\theta_1}{n_R}\right) = 19.20$ ccw $\quad \theta_V = \sin^{-1}\left(\frac{n_1 \sin\theta_1}{n_V}\right) = 18.82$ cw

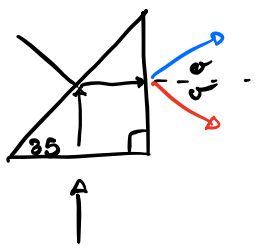
$n_1 = 1.00$
$\theta_1 = 30$
$n_R = 1.52$

$n_1 = 1.00$
$\theta_1 = 30$
$n_V = 1.55$

$\theta = 0.39°$

23.P.22

$\lambda = 656$ nm $\quad n_R = 1.572$
$\lambda = 486$ nm $\quad n_B = 1.587$



a.) $n_R = 1.57$
$n_B = 1.59$

b.) Red

$n_1 \sin\theta_1 = n_2 \sin\theta_2$

$\theta_2 = \sin^{-1}\left(\frac{n_1 \sin\theta_1}{n_2}\right)$

$n_1 = 1.572$ $\quad n_2 = 1.00$
$\theta_1 = 35°$ $\quad \theta_2 = 64.37°$

Blue

$n_1 \sin\theta_1 = n_2 \sin\theta_2$

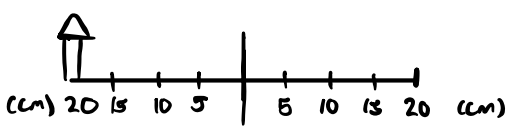
$\theta_2 = \sin^{-1}\left(\frac{n_1 \sin\theta_1}{n_2}\right)$

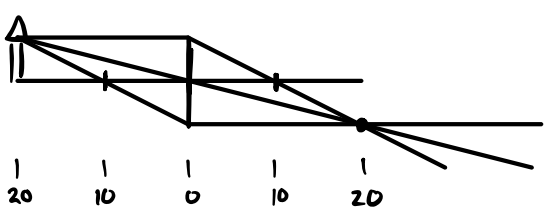
$n_1 = 1.587$ $\quad n_2 = 1.00$
$\theta_1 = 35°$ $\quad \theta_2 = 65.54°$

$\theta = 1.16°$

$\theta = \theta_B - \theta_R = 1.16°$

23.P.24





$d = 20$ cm